



## BIOL-181 – Introductory Human Anatomy and Physiology 1

University Arts and Science

**Effective Term & Year:** Fall 2022  
**Course Outline Review Date:** 2025-04-01

---

**Program Area:** Math and Sciences

**Description:**

This course is an introduction to the structural and functional aspects of the human musculoskeletal, cardiovascular, and respiratory systems. BIOL 181 is presented in a lecture-lab format. The physiology portion of the course is primarily taught during the lecture portion while the anatomy and application portion of the course is dealt with during the laboratory periods.

---

**Program Information:**

This course is required for the first year of the Bachelor of Science in Nursing Program and is an elective in other disciplines.

**Delivery Methods:** On-campus (Face-to-Face)

**Credit Type:** College of the Rockies Credits

**Credits:** 3

**Course type/s:** Sciences, Lab Sciences

**Instructional Activity and Hours:**

Activity	Hours
Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	
Laboratory/Studio	45
Practicum/Field Experience	

---

Co-op/Work Experience	
Other	
Total	90

---

**Course Requisites:**

- Complete 1 of the following
  - Completed at least 1 of the following:
    - BIOL090 – Biology-Provincial Level (Human Biology) (3)
    - ATPH 12 – Anatomy and Physiology 12
    - BIOL101 – Introduction to Biology 1 (3)
    - BIOL101 – Introduction to Biology 1 (3)
  - Life Sciences 11 and Chemistry 12 Highly recommended.

**Flexible Assessment:** Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

---

**Course Transfer Credit:**

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see <https://www.bctransferguide.ca/> or <https://transferalberta.alberta.ca> . For more transfer credit information, please visit <https://www.cotr.bc.ca/Transfer>

All requests for course transfer credit from institutions in British Columbia or elsewhere should go to the College of the Rockies Enrolment Services office.

---

**Textbook Resources:**

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

OpenStax College, Anatomy & Physiology. OpenStax College. 25 April 2013.  
<http://cnx.org/content/col11496/latest/>.

BIOL 181 Lab Manual- Available in the College Bookstore

*Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> for a complete list of the currently required textbooks.*

---

## **Learning Outcomes:**

Upon the successful completion of this course, students will be able to:

- use a compound microscope to identify organs, glands, tissues, and cell types from dissections of preserved specimens and observations of prepared slides;
  - use anatomical, directional, and regional terminology to identify the position and location of body structures, and describe muscle actions;
  - identify the four basic tissue types and provide examples in the body of each, including their classes and subclasses;
  - describe the structure and function of bones and the skeletal system, including the processes of bone formation and bone repair;
  - describe the structural and functional classification of joints, and provide examples in the body of each;
  - describe the structure and function of muscle tissue, and describe the process of skeletal muscle contraction;
  - describe the structure and function of the cardiovascular system, including the heart, blood vessels, and blood, and the control of heart rate and blood pressure;
  - describe the structure, function, and control of the respiratory system, including the mechanism of breathing and the process of gas exchange
  - describe the relationship between the normal structure and function of specific body systems and the maintenance of homeostasis; and
  - describe the relationship between abnormal structure and function of specific body systems and the development of disease.
- 

## **Course Topics:**

### **1. ORGANIZATION OF THE BODY**

Levels of Structural Organization

Maintaining Life

Homeostasis

The Language of Anatomy

- Anatomical Position and Directional Terms

- Regional Terms
- Body Planes and Sections
- Body Cavities and Membranes

## Structure and Function of Cells

### Histology

- Basic Characteristics
- Definition
- Epithelial Tissue
- Connective Tissue
- Nervous Tissue
- Muscle Tissue
- Tissue Repair

## Structure and Function of Skin

## **2. COVERING, SUPPORT & MOVEMENT OF THE BODY**

### **A. Bones & Skeletal Tissues**

#### Functions of the Bones

#### Classification of Bones

#### Bone Structure

- Gross Anatomy
- Microscopic Structure of Bone
- Bone Markings
- Chemical Composition of Bone
- Bone Development (Osteogenesis)
- Endochondral Ossification
- Intramembranous Ossification
- Physiological Control of Bone Formation/Maintenance
- Bone Homeostasis: Remodeling and Repair
- Bone Remodeling
- Repair of Fractures
- Introduction to Bone Disorders

### **B. Joints**

#### Introduction to Articulations

- Structural and Functional Classification of Joints

Fibrous Joints

Cartilaginous Joints

Synovial Joints

- General Structure and Characteristics
- Types of Synovial Joints
- Introduction to Synovial Joint Injuries

## **C. Muscles and Muscle Tissue**

Functions of Muscle Tissue

Muscle Types

Skeletal Muscle

- Gross Anatomy of Skeletal Muscle Tissue
- Microscopic Anatomy of a Skeletal Muscle Fiber
- Contraction of a Skeletal Muscle Fiber
- How Muscles Respond to Stimuli
- The Molecular Basis of Muscle Contraction
- Regulation of Contraction
- Contractions of Skeletal Muscle
- Motor Unit
- Muscle Twitch/Tension
- Muscle Tonus
- Types of Skeletal Muscle Fibers
- Muscle Metabolism
- Energy Storage
- Muscle Fatigue
- Force, Velocity and Duration of Muscle Contraction
- Force of Contraction
- Muscle-joint Lever Actions
- Muscular Dystrophy, Atrophy and Hypertrophy
- Thermoregulation
- Hypothermia
- Hyperthermia
- Smooth Muscle
- Microscopic Structure
- Contraction
- Introduction to Muscle Disorders

## **3. THE CARDIOVASCULAR SYSTEM**

### **A. The Heart**

## Size, Location and Orientation

- Coverings
- Heart wall
- Chambers & Associated Vessels
- Pathway of Blood
- Coronary Circulation
- Heart Valves
- Properties of Cardiac Muscle
- Microscopic Anatomy
- Mechanism and Events of Contraction
- Energy Requirements
- Cardiac Physiology
- Electrical Events and the Cardiac Cycle
- Electrocardiography
- Heart Sounds
- Cardiac Output
- Regulation of Stroke Volume
- Preload: Degree of Stretch
- Afterload: Back Pressure
- Regulation of Heart Rate
- Introduction to Cardiac Disorders

## **B. Blood Vessels**

### Blood Vessel Structure and Function

### Physiology of Circulation

- Introduction to Blood Flow, Blood Pressure and Resistance
- Systemic Blood Pressure
- Factor Influencing Blood Pressure
- Regulation of Blood Pressure

### Circulatory Pathways: Blood Vessels of the Body

### Fetal Circulation

### Introduction to Vascular Disorders

## **C. Blood**

### Composition and Functions of Blood

### Cellular Phase

- Erythrocytes
- General Structural and Functional Characteristics

- Production of Erythrocytes
- Regulation of Erythropoiesis
- Fate and Destruction of Erythrocytes
- Leukocytes
- General Structural and Functional Characteristics
- Types
- Platelets
- Liquid Phase
- Components of Blood Plasma

Hemostasis

Introduction to Blood Disorders

## **D. The Lymphatic System**

Structure and Function

## **4. THE RESPIRATORY SYSTEM**

Functional Anatomy of the Respiratory System

Mechanics of Breathing

- Respiratory Muscles
- The Respiratory Reflex
- Control of Respiration
- Spirometry
- Respiratory Volumes and Capacities
- Pulmonary Function Tests
- Alveolar Ventilation Role

Gas Exchange in the Body

- Basic Properties of Gases
- Composition of Alveolar Gas
- Gas Exchange Between the Blood, Lungs and Tissues
- Transport of Respiratory Gases

Introduction to Respiratory Disorders

## **LAB PROGRAM**

Lab 1: Histology: the study of tissues

Lab 2: Anatomical positions, planes and the axial skeleton

Lab 3: The appendicular skeleton

Lab 4: Articulations

Lab 5: The cardiovascular system

Lab 6: Anatomical and physiological aspects of respiration

Lab 7: Hematology

Lab 8: Muscles I – muscles of the torso, neck and head

Lab 9: Muscles II – muscles and associated structures of the leg and arm

See instructor’s syllabus for the detailed outline of weekly readings, activities and assignments.

## Evaluation and Assessments

### Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Midterm 1	15%
Midterm 2	15%
Lab Exam 1	15%
Lab Exam 2 (cumulative)	25%
Final Exam (cumulative)	30%
Total	100%

### Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

**Pass requirements:** None

**Evaluation Notes:** A grade of “D” grants credit, but may not be sufficient as a prerequisite for sequential courses.

#### Evaluation Notes Comments:

Nursing students must achieve a grade of C or better in BIOL 181 in order to be eligible for, or continue in, the BSN program.



---

## **Exam Attendance:**

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a "0" on the exam.

---

## **Academic Policies:**

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.4.3 Students with Documented Disabilities
  - Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
  - Policy 2.5.8 Academic Performance
  - Policy 2.5.3 Grade Appeal
  - Policy 2.4.9 Student Concerns Re Faculty
- 

## **Course Changes:**

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.